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REMARKS

Claim 13 has been amended to recite the specific embodiment of the present invention included in claims 23 and 24. Applicant reserves the right to pursue additional embodiments in one or more continuing applications. Claims 23 and 24 have been cancelled, without prejudice, by this amendment. New claim 25 has been added relating to an embodiment of the present invention in which a substantially globular lyogel is produced and reacted with a silylating agent. Support for this new claim can be found in the present specification, in particular page 7, paragraph 4. No new matter has been added. Thus, claims 13-22 and 25 are pending.

Rejection of Claims under 35 U.S.C. § 102(b)

The Examiner has rejected claims 13-14 and 16-19 under 35 U.S.C. § 102(b) as being anticipated by Bergna et al. (U.S. Patent No. 4,131,542), with the Grant and Hackh's Chemical Dictionary and Chemical Engineer's Handbook to show inherent state of fact.

Applicants respectfully traverse this rejection. As amended, claim 13 includes the features recited in claims 23 and 24. These claims were not found to be anticipated by this reference. Therefore, Applicants believe that the rejection of this claim is moot. Furthermore, claims 14 and 16-19 depend directly or indirectly from claim 13, making the rejection of these claims moot. Therefore, Applicants respectfully request that the rejection of claims 13-14 and 16-19 be withdrawn.

Regarding new claim 25, this claim recites a method of producing substantially globular silylated lyogels in which a substantially globular lyogel is produced and reacted with a silylating agent. There is no disclosure in Bergna '542 of silylation. Therefore Applicants believe that claim 25 is not anticipated by Bergna '542.

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Rejection of Claims under 35 U.S.C. § 103(a)

Bergna et al.

The Examiner has rejected claims 13-14 and 16-22 under 35 U.S.C. § 103(a) as being unpatentable over Bergna et al. (U.S. Patent No. 4,131,542), with the Grant and Hackh's Chemical Dictionary and optionally in view of Chemical Engineer's Handbook.

Applicants respectfully traverse this rejection. As discussed above, claim 13 has been amended to include the features recited in claims 23 and 24, which were not found to be unpatentable in view of this reference. Claims 14 and 16-22 depend directly or indirectly from claim 13. Therefore, Applicants believe that the rejection of claims 13-14 and 16-22 is moot and respectfully request that this rejection be withdrawn.

Regarding new claim 25, this claim recites a method of producing substantially globular silylated lyogels in which a substantially globular lyogel is produced and reacted with a silylating agent. There is no disclosure in Bergna '542 of silylation. Therefore Applicants believe that claim 25 is patentable over Bergna '542.

Marisic in view of Fernholz et al., optionally further in view of Mielke et al.

The Examiner has rejected claims 13-24 under 35 U.S.C. § 103(a) as being unpatentable over Marisic (U.S. Patent No. 2,384,946) in view of Fernholz et al. (U.S. Patent No. 3,939,199) and optionally further in view of Mielke et al. (U.S. Patent No. 5,656,195).

On page 4 of the Office Action, the Examiner states that Marisic '946 discloses a process of producing hydrogel pellets by continuously contacting within an enclosed mixing chamber such as an injector or nozzle mixer, streams of reactant solutions of such concentration and proportions that no gelation occurs with the mixer, but only at some predetermined time after leaving the mixer, and under such conditions of flow that each stream is completely and uniformly dispersed with and throughout the other at the instant of contact. The Examiner also states that the resultant colloidal solution is ejected from the mixer through an orifice or orifices of suitable size so as to form globules of the solution which are

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introduced into a fluid medium where the globules of the colloidal solution set to a gel before they pass out of the medium. The Examiner further identifies other features of Marisic '946, including the formation of pellets by a process analogous to spray drying wherein the gelable solution is sprayed into a drying tower, that the fluid medium, which may contain components, can be constituted of a gas such as air and is maintained at a temperature below the boiling point of the sol, and that the hydrogel can be produced from a solution of sodium silicate and hydrochloric acid.

The Examiner notes that Marisic '946 does not specifically disclose the temperature of the process. However, the Examiner concludes that it would have been obvious to optimize these process conditions to obtain the best results as well as to dry the hydrogel to obtain aerogel, since aerogel is desired in the art. The Examiner adds that, in the event that the heat treating step of Marisic '946 is not sufficient to convert the hydrogel to aerogel, Mielke '195 teaches that silica aerogel particles, which are desired to be used in moldings, can be produced by solvent exchange and subsequent supercritical drying of a silica hydrogel. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art to convert the hydrogel of Marisic '946 to aerogel because aerogel is desired to be used in moldings as suggested by Mielke '195.

The Examiner also notes that Marisic '946 does not disclose that the fluid is moving substantially against the direction of gravity. However, the Examiner states that Fernholz '199 discloses that for a spray-drying process for converting a sol to a gel, in order to avoid damage of the gelled and still soft particles, they can be sprayed in an upward inclined direction and collected in a liquid bath (for example water) or they can be conducted in counter current flow with a current of air or gas which reduces their impact velocity and simultaneously improves their resistance to drying. The Examiner therefore concludes that it would have been obvious to one of ordinary skill in the art at the time the invention was made to use a current of air or gas in counter current flow with the spray of silica sol in the process of Marisic '946, as suggested by Fernholz '199 because such counter current flow of air would reduce the silica gels impact velocity and improve their resistance by drying. The Examiner further concludes

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that, for claim 20, the subject matter as a whole would have been obvious to one having ordinary skill in the art at the time the invention was made to have used both the water bath and the counter current flow of air to avoid damage of the gelled and still soft particles, because combining two or more ways as disclosed in Fernholz '199 for the same purpose has been held to be a prima facie case of obviousness.

Applicants respectfully disagree. Regarding claims 13-23, claim 13 recites a method of producing substantially globular aerogels in which gel forming components are mixed to produce a lyosol, after which the lyosol, in order to form a lyogel, is introduced into a moving medium which flows substantially against the direction of gravity, to produce a substantially globular lyogel, which is converted to an aerogel.

Marisic' 946 describes a process of producing hydrogel pellets by continuously contacting, within an enclosed mixing chamber, streams of reactant solutions of such concentration and proportions that no gelation occurs with the mixer, but only at some predetermined time after leaving the mixer, and under such conditions of flow that each stream is completely and uniformly dispersed within and throughout the other at the instant of contact. The resulting colloidal solution is ejected from the mixer so as to form globules of the solution, which sets to a gel before they pass out of the medium. Thus, Marisic' 946 teaches introducing a hydrosol into a vapor atmosphere. However, as noted by the Examiner, Marisic '946 does not disclose introducing a lyosol into a medium which flows substantially against the direction of gravity.

In order to cure this deficiency, the Examiner relies on Fernholz '199, which relates to a process for oxyacylating olefins in the gaseous phase using a supported catalyst comprising palladium on a carrier. Applicants continue to believe Fernholz '199 is not analogous art to either Marisic '946 or the present invention and that, therefore, one skilled in the art would not be motivated to combine Marisic '946 and Fernholz '199.

Furthermore, even assuming *arguendo*, that Fernholz '199 is analogous art, which Applicants disagree with, Applicants believe that this reference would not be combined by one skilled in the art with Marisic '946 since they teach different processes. In particular, Fernholz

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'199, in describing the preparation of a carrier used for supporting the catalyst that is used for the oxyacylation process, states that particles without pores are needed, and various processes are described for forming these particles (see column 1, line 66 to column 2, line 9). From these small particles, larger balls, tablets, or granules are produced, and various processes are described for doing this (see column 2, line 10-33). One method involves spraying a thin paste of the particles into a sol and allowing the sol to gel in the free fall, which can be conducted in counter current flow with a current of air or gas. Thus, Fernholz '199 teaches a process for converting small particles into larger forms using a sol and spraying the mixture in, for example, a counter current flow of air.

This process is very different from that of described in Marisic '946, which teaches starting with and forming different materials. In particular, Marisic '946 expressly states that "gels of various inorganic oxides may be prepared ... by causing a hydrosol to set to the corresponding hydrogel ... against a fluid medium which is not miscible with the hydrosol" (see page 1, left column, lines 10-17). There is no disclosure in Fernholz '199 of a hydrosol nor of the formation of a hydrogel. Instead, Fernholz '199 describes combining small particles with a sol in order to create larger forms of these particles. Applicants believe that one skilled in the art would not apply a method of spray drying a mixture of particles and sol in order to attempt to convert a hydrosol into a hydrogel. Thus Applicants believe that Fernholz '199 would not be combined with Marisic '946 and thus cannot cure the deficiencies of this reference.

Regarding Mielke '195, the Examiner states that this reference teaches that aerogel particles are desired to be used in moldings and further discloses that the silica aerogel can be produced by solvent exchange and subsequent supercritical drying of a silica hydrogel. However, none of the present claims recites a molding. Furthermore, there is no teaching or suggestion anywhere in Mielke' 195 of a process in which a lyosol is introduced into a medium which flows substantially against the direction of gravity. Therefore, Mielke '195 also cannot cure the deficiencies of Marisic' 946.

Therefore, Applicants believe that claim 13 is patentable over Marisic in view of Fernholz et al. and optionally further in view of Mielke et al. Claims 14-22, which depend either directly

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or indirectly from claim 13, recite further embodiments of the present invention and, for at least the reasons discussed above, are also patentable over this combination of references. Claims 23 and 24 have been cancelled, making the rejection of these claims moot.

For these reasons, Applicants believe that claims 13-24 are patentable over Marisic in view of Fernholz et al., optionally further in view of Mielke et al. and respectfully request that this rejection be withdrawn.

Regarding new claim 25, this claim recites a method of producing substantially globular silylated lyogels in which a substantially globular lyogel is produced and reacted with a silylating agent. Since Applicants believe that the method of producing substantially globular lyogels is patentable over Marisic in view of Fernholz et al., optionally further in view of Mielke et al., the method of claim 25 is also patentable over this combination of references. In addition, there is no disclosure in Fernholz et al. of silylation. Therefore Applicants believe that claim 25 is patentable over this combination of references.

Conclusion

In view of the foregoing remarks, Applicant believes that this application is considered to be in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

Respectfully submitted,



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Robert M. Amici
Reg. No. 52,554
CABOT CORPORATION
Law Department
157 Concord Road
Billerica, MA 01821
(978) 670-6191

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